

## Can Facebook Improve Students' Engagement in Flipped Classes? Community of Inquiry Approach

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### Abstract

*This paper aims at using Facebook to improve the students' engagements with the flipped learning materials through implementation of a socially enabled peer learning environment. The article reports an experiment comparing the online quizzes and Facebook to increase the students' engagement with the online materials in flipped classes. The study looks at the students' perceptions. The current study utilizes the Community of Inquiry (RCOI) to analyze the students' opinions about using Facebook for implementation of flipped learning. The paper provides recommendations to the instructors on how to use Facebook for increasing the students' engagement with the flipped materials. This study also motivates teaching practitioners in Information Systems to improve flipped learning by using social networking sites in their courses.*

### 1. Introduction

In recent years, implementation of flipped learning strategies has become more prevalent. Romero et al. [1] define flipped learning as a hybrid method that uses interventions to interchange lecture time to “homework” and utilizes interactive learning for the face-to-face classroom time. Flipped classes encourage students to learn the contents of the course prior to coming to class and practice the materials with discussion or task-oriented exercises [2]–[4]. Flipped classrooms allocate more class time for in-class exercises. They also transform the focus of the theoretical learning to students at home by providing accessibility to advanced technologies in order to support a blended learning approach. Flipped learning models suggest leveraging the access of online video/materials to students prior to coming to classrooms, so that students are adequately supported and prepared to participate in more interactive activities, such as problem solving and discussions [5], [6].

One of the advantages of flipped classrooms is the opportunity given to the students to study the online learning materials at their convenience and utilize their individual level of comprehension. In physical participation of students in classes, students will be provided more interactive and group discussions targeting the problem solving activities as opposed to listening to theoretical lectures. Therefore, teachers are able to monitor students in the class and provide feedbacks [7]. There has been a body of literature that reveals various advantages of flipped classrooms [8]–[11]. However, some challenges have also been reported in their implementation of flipped classes. Elliot [12] introduces “front loading” challenge for the implementation of flipped classes. Flipped Learning requires a strong motivation enabling students to prepare the work in advance as compared to lectures where minimal effort is to be made before class time. In fact, due to more work preparation required for Flipped Learning, a survey done in a study by [13] reveals that students are less satisfied with Flipped Learning versus traditional learning. This basically leads to less students' engagement with the materials. Talaei Khoei et al. [14] believes the demotivation among students to engage with the flipped class materials is due to the lack of social context in learning the contents before coming to the lectures. This is in agreement with what has been explored in peer tutoring by Talaei-Khoei and Daniel (2016). Topping (2005) believes that peer support can occur through tutoring process or a goal-oriented collaborative learning in a group. Peer tutoring looks at the interactions among students with the focus on the curriculum. While the peer tutoring has been shown in literature as an effective practice for improving students' engagement [16], [17], Delaney et al. [18] implement an online discussion board and highlight the role of collaborative tools to facilitate the peer tutoring and engaging students with flipped learning materials.

The track history of Social Network Sites (SNS), as learning tools, goes back to the use of online

discussion boards that organize online community conversations along a thread of content or learning objectives [19]. Although discussion boards are powerful tools to handle content-related interactions, they lack a comprehensive social engagement and non-pedagogical relationships among students that required for an effective peer tutoring environment [20]. Social engagement among learners can be boosted by social media sites such as Facebook [14], [21]. There are two main reasons for that. First, Facebook has been proven as a successful platform in terms of user engagement [22], [23]. Second, students prefer Facebook for both socialize and facilitating peer learning. In a large-scale study [24], 91% of undergraduate students claimed that they hold and use a Facebook account. Among these, 54% of students utilize Facebook for their learning. Talaei Khoei et al. [14] state that students prefer Facebook over discussion boards in the learning management systems because of the rigid structure of the discussion boards and also social connections that Facebook provides.

The role of Facebook in facilitating peer learning practices to improve the students learning has been highlighted in the literature [4], [25]. While Li et al. (2013) in an experimental setting indicate that students' engagement with flipped materials using Facebook is higher compared to traditional learning, a deep understanding the underlying relationship between using social networking sites like Facebook for flipped classes and the students' engagement has not been addressed from the students' perspective.

The current study looks at the implementation of Facebook to engage students with the flipped activities and accordingly to improve their learning outcomes. For this to happen, the present research studies the students' perception on the use of Facebook in flipped classes. This article is an attempt to address the following research question (RQ):

- RQ: From the students' perception, how should instructors implement Facebook in flipped classes?

This study understands the value that Facebook creates to the students' learning in flipped classes. The current work also benefits teaching professionals with what students suggest for the design of the flipped classrooms to successfully engage them with the materials prior the class.

The rest of this article organized in the following way: Section 2 defines the students' engagement and presents the analytical framework used in this study. Section 3 presents the research methods. Section 4 demonstrates the results. Finally section 0 summaries the paper and discusses the implications of the work

as well as its limitations. The section also points out the limitation of this article opening to future avenues of research.

## 2. Students' Engagement: Community of Inquiry (COI)

Astin [26] defines student engagement as "the amount of physical and psychological energy that the student devotes to the academic experience". Marks [22] highlights the concept of involvement by explaining that student's engagement as a behavioral participation is directly related to the quality of learning experience. Following this outcome, Garrison, Anderson, & Archer (2000) suggest the three presences namely cognitive, social and teaching in Community of Inquiry (COI) as overlapping and interacting processes related to the quality of learning experience that determine the students' engagement with online education. *Cognitive presence* refers to the extent that learners construct meaningful interest from the environment. *Social presence* refers to the ability of learners to project their personal characteristics into the learning community. *Teaching presence* is defined as the design, facilitation, and direction that the instructor should provide [29].

The current study has adopted the COI definitions for successful students' engagement with learning interventions including cognitive, social, teaching and learning presences. COI has been referenced as the analytical framework in this study.

## 3. Method

### 3.1 Context

The students in a second-year undergraduate course in Bachelor of Information Systems were invited to participate in the study. Only 11 students did not participate, which remained the experiment with 284 students (range 19 – 37 years; Mean = 22.1; SD = 2.3 ; 154 males).

The topic of the course was enterprise resource planning (ERP) from management perspective, but with some technical flavor such as introducing the technologies that can be used in ERPs. The course did not involve any hands on experience by students but focused more on managing an ERP system in an organization. For twelve weeks, the course had ninety minutes of lectures, ninety minutes of tutorial/workshop sessions weekly. The lectures were given by the course coordinator and the tutorials/workshops in classes of 24 students were managed by teacher assistants.

### 3.2 Design

The course offered four flipped classes; two at the earlier stage of the semester and two at the later stage. In all these four classes, the lecture materials were provided to students on the online learning management systems to study prior to the class. Some extra videos were also provided. In the first flipped class in week 3 and the fourth flipped class in week 10, the students were asked to participate in an online voluntary quiz that included five discussion questions about the topic. In the second flipped class in week 5 and the third experiment in week 8, students were asked to voluntarily discuss five discussion questions on the Facebook group of the course. Then, in all these four flipped classes in weeks 3, 5, 8 and 10, the students when physically were participating in the class were given five similar but not the same questions about the topic of the week in hardcopy.

Following Facebook intervention (i.e. weeks 5 and 8), students were given a questionnaire that included three open ended questions asking the students' opinion about the advantages, disadvantages of using Facebook and if they have any recommendations. The questionnaires in weeks 5 and 8 were identical, which enabled us to compare the results for the sake of reliability and to see if students' opinion can be changed by getting more experiences about the intervention.

### 3.3 Qualitative Analysis of Students' Perception

The qualitative analysis aiming at coding the relevant categories of sentences has two steps; (1) Automated Detection of Categories, and (2) Manual Refinement of Results. The approach taken in this study to code the categories is similar to what was used in (Deng et al., 2016), however we used a different software package.

Step 1: Automated Detection of Categories of Sentences: The analysis of interviews was conducted using Alceste software ("Alceste software," 1986). First, Alceste identified contextual units - equivalent to sentences, in the transcripts. Then, the software computed the data matrix including the words that recognized by the Alceste already-implemented ontology. The data matrix showed what words were present in each sentence. The words repeated less than four times were excluded ("Alceste software," 1986). The final part of step 1 was to generate categories of sentences. Alceste uses Divisive Hierarchical Clustering (DHC) algorithm (Merten et al., 2012). This algorithm attempts to maximize the significant difference of each two categories by iteratively trying

different sentences in different categories. The significant difference presented by  $X^2$  was calculated in Alceste using the Chi Square Test. Only the categories that have ( $X^2 > 10.8$ , significant at the 0.1% level) were included. The percentage of contextual units classified in the interviews was 67.1%, which means that 67.1% of the answers were somehow related to common topics. This was a good result for qualitative responses [30].

Step 2: Manual Refinement of Results: This step included human intervention to refine the automated generated categories. First, authors merged the categories into one category if their sentences were similar. Then, they split the categories if their sentences were different. The relevant categories were grouped to make up a hierarchical structure including categories and sub-categories. This was iteratively repeated till no changes were desired.

## 4. Results

### 4.1 Cognitive Presence

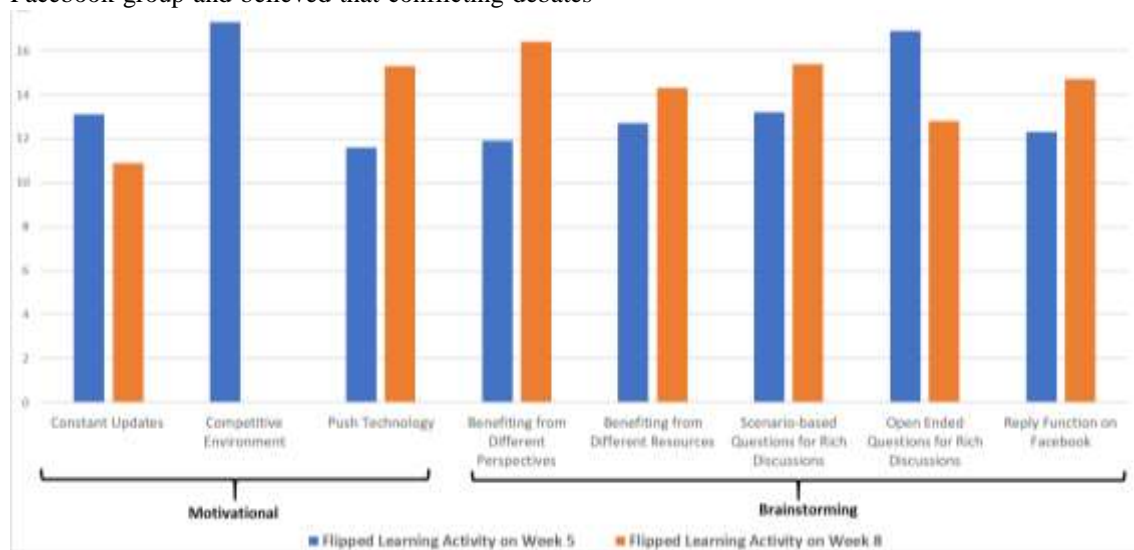
Our study shows (See Figure 1) that students value the use of Facebook as a motivational environment that promotes brainstorming to help their cognitive engagement with the flipped learning materials. The students believed that motivation was built through a competitive environment that was facilitated by the constant Facebook updates. These updates despite the discussion boards of the online learning management system were pushed to the students when they do not even intend to check the course. However, it was also noticed that the students on week 8 did not see Facebook anymore as a competitive environment. The students indicated that although Facebook can promote brainstorming to improve their engagement with the flipped materials through diversity of perspectives and resources, it needs the posts to be open-ended and reflecting the real scenarios. They also pointed out that providing reply function for the students' comments would help to facilitate their engagement with the discussions.

### 4.2 Social Presence

Our findings demonstrate (see Figure 2) that the students could develop sense of community, which helped them engaging with the online materials. The students could feel that they are the member of this online community and their contribution not only influences the group but also is rewarded. They also share the feeling of participation in responding to the

posts. All these could empower the sense of community among students. The students value the collaborative nature of the Facebook group and believed that conflicting debates

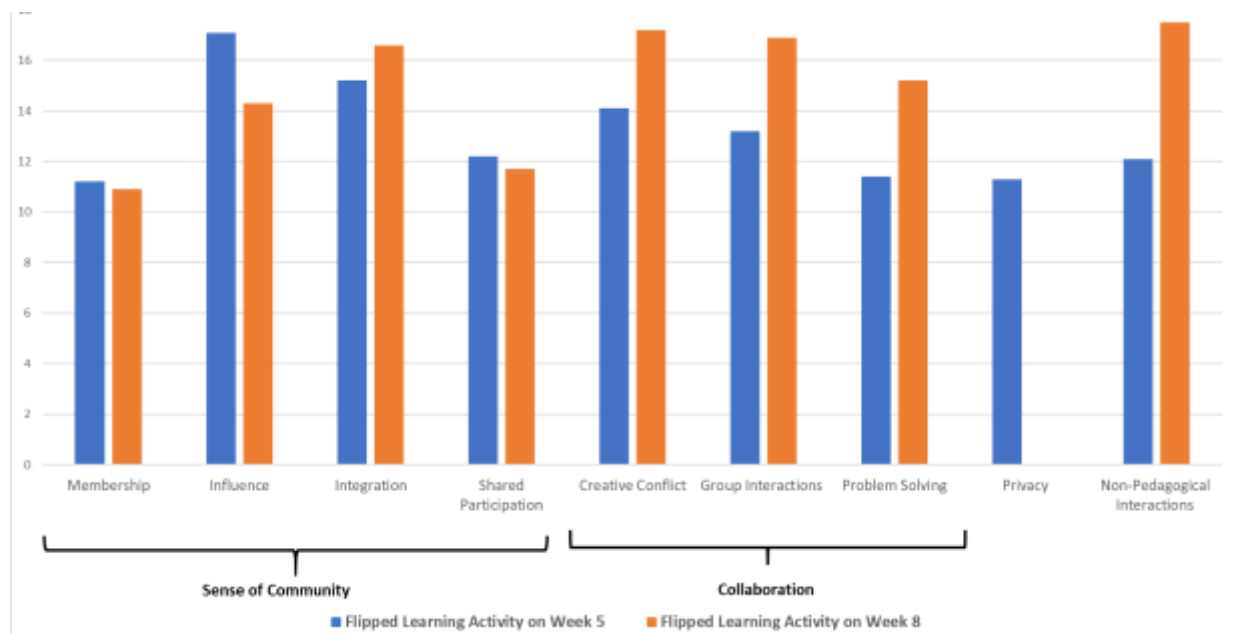
and group interactions to solve real case problems can contribute in their engagement.



**Figure 1 : Students' Perception: Cognitive Presence**

Although some students showed their concern about privacy issues by using Facebook, it was observed that this concern was not disturbing them in the second attempt on week 8. The students also believed

that the non-pedagogical interactions occurred during the Facebook conversations created a desirable social context, which helped students to engage.



**Figure 2 : Students' Perception: Social Presence**

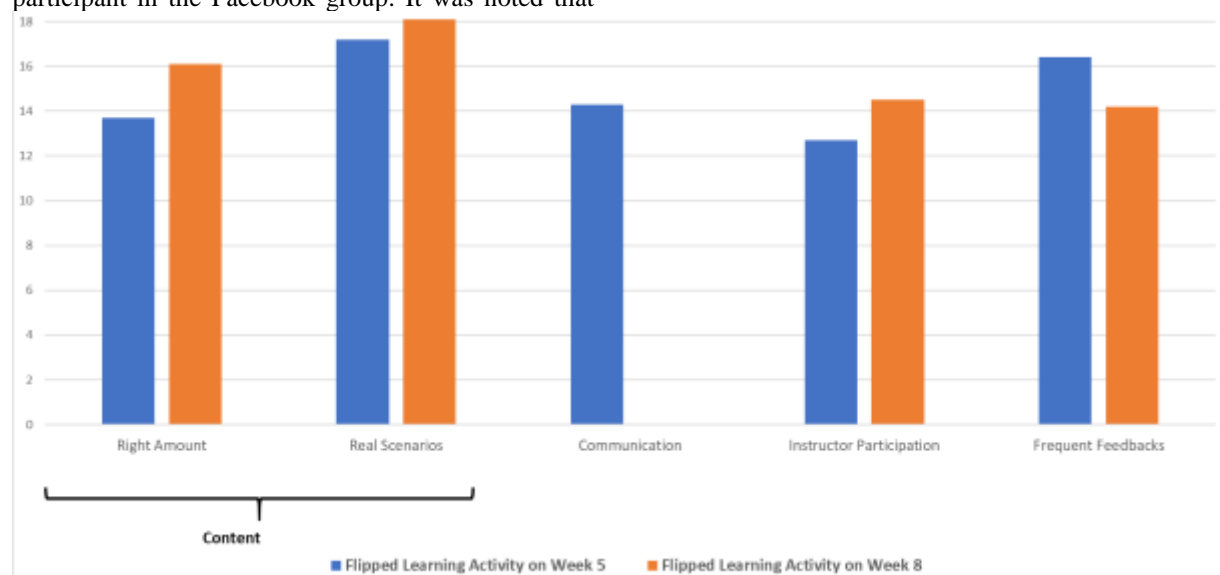
### 4.3. Teaching Presence

Our findings show (see Figure 3) that the teaching practices to deploy Facebook for engaging students with the flipped materials require instructors'

attention to the amount of the content and providing real scenarios. It was also revealed that the clear communication with students about the details of the activity has a significant role in engaging students

with the flipped materials. The students believed that the instructor should response to their discussions and clarifies the correct answer quickly. It was found that the students prefer to see the instructor involved as a participant in the Facebook group. It was noted that

although clear communication was pointed out in the first round, once the students experienced the intervention and realized the objectives, they did not raise any concern about this issue in the second round.



**Figure 3 : Students' Perception: Teaching Presence**

## 5. Conclusion, Discussion and Future Work

In this research, an experiment has been reported on 284 second year Information System students for an ERP undergraduate course. The experiment was a longitudinal study in four flipped classes on weeks 3, 5, 8 and 10. In these four classes, the students were given the materials prior to the class on the learning management system. While the first and the last class required students to participate in online quizzes including five discussion questions in advance to the physical presence in the class, the second and the third classes needed the students to participate in the five discussion posts put by the course coordinator on the Facebook group. In what follows, the findings of this experiment will be discussed.

### 5.1. Implications: Recommendations to Instructors for Implementation of Facebook in Flipped Classes

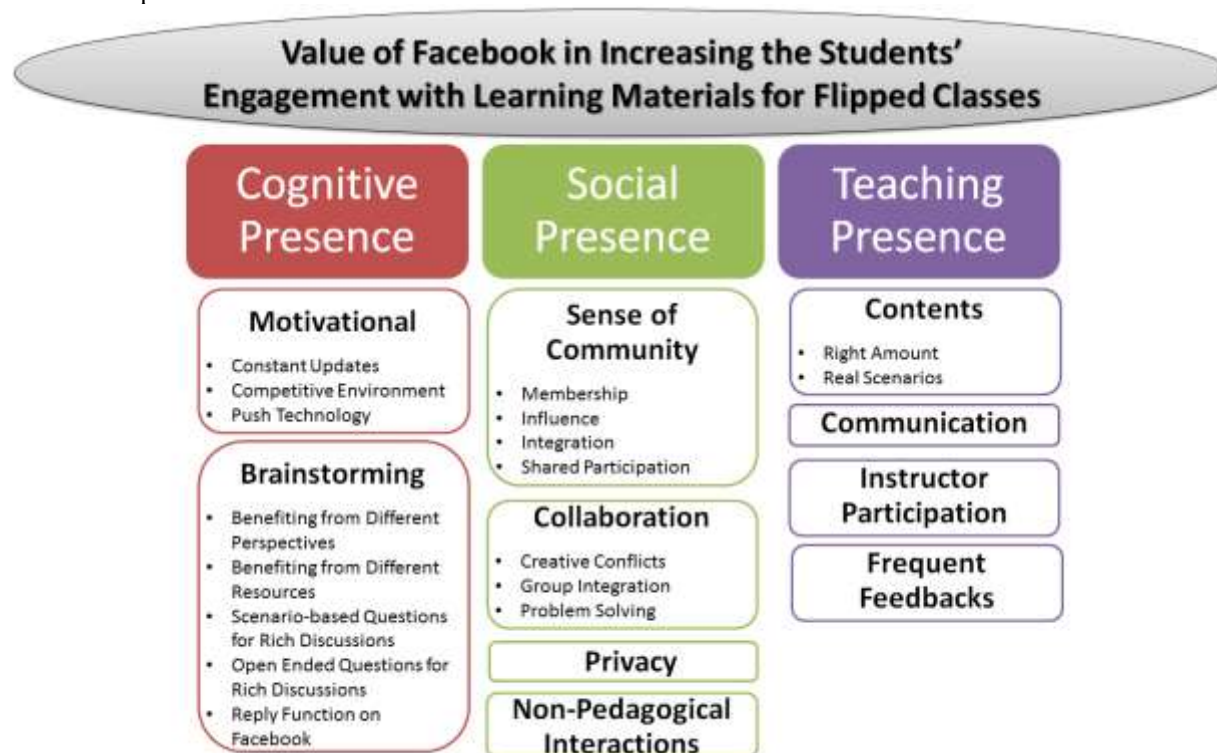
In response to the research question, the students in week 5 and 8, who were asked to discuss the questions on Facebook, were also given questionnaires to express their perceptions about the Facebook intervention. The questionnaires in both weeks were identical to see if the students' opinions

have been changed over experiencing the intervention. The results are summarized in Figure 4 from the lens of COI. The students' engagement was investigated and the students' Responses were analyzed from the lens of Revised Community of Inquiry (COI). Following the work of [7] that measured the students' engagement in flipped classrooms from COI perspective, the current study looks at implementing strategies that include Facebook to improve students' engagement with flipped materials. In the following, the findings of students' perception is discussed and lessons learned from the experiment is presented; See Figure 4.

In terms of cognitive presence, the instructors are recommended to utilize Facebook as a means of motivation and brainstorming. In order to promote Facebook as a motivational tool that can engage students with the flipped materials, the instructors should make sure that the constant updates are provided on the Facebook page which engage students with the materials and encourage them to participate in a competitive learning environment. However, it was observed that the students, after experiencing this intervention once, did not conduct serious competition on Facebook group. The reason behind this should be investigated in future research.

One of the limitations of conventional online learning environments such as Blackboard and Moodle in comparison with Facebook is the push technology. The push mechanisms of Facebook indicate a new discussion point to students on their smart phone. This means that the flipped activity that they are undertaking can be more actively at the forefront of their daily life. This constant reminder of discussion points can help students become more involved with their flipped materials to be able to participate in the competitive learning environment and trying to give more comprehensive responses on Facebook page. The down side of this argument is the 24/7 engagement with technology that can have its harmful impacts at all levels of human endeavor.

Using Facebook as a brainstorming tool is recommended. Facebook provides discussions from different perspective and facilitates accessing different resources. These can be put up by students and helps them with the complete comprehension about the flipped topic. However, the instructors are suggested to use real scenarios that provide open ended discussions, otherwise the discussions will be dull and repetitive. From technical perspective, the instructors are recommended to set the reply function of Facebook for the comments that students provide to each posted question. This increases the students' engagement with the discussions and accordingly with the flipped materials.



**Figure 4 Value of Facebook in increasing the Students' Engagement with Learning Materials in Flipped Classes – COI Analysis**

The social presence relates to the formation of a social reality perspective that can be found in cultivation theory [31], [32]. Cultivation theory in most basic form suggests that social media is responsible for shaping social reality. In this regard, instructors to implement Facebook for flipped classes are recommended to pay attention to the elements of social presence; namely the sense of community created in such Facebook groups, the collaboration conducted, privacy and non-pedagogical interactions. The finding of this study for the sense of community created in the Facebook group is in agreement with the theory of sense of community [33]. Following this

theory, the instructors are recommended to ensure highlighting the students' membership in the class by emphasizing on joining to the Facebook page. The students providing their responses should believe in their influence and impact on the learning process of the class. The instructors are recommended to facilitate this mental process as possible. The instructors are suggested to embedded learning materials and objectives in the responses to the Facebook posts... It is important that the students feel that this is beneficial for them to participate in this activity. This can be demonstrated through better understanding of the topic of the flipped class. The

instructors should make sure that the students are not only listeners, as this may stop others for contributing. The students should believe that they share the participation in the Facebook page and accordingly in the learning community of the class. That improves their sense of community. The instructors should also facilitate the collaboration of students through creative conflicts and debates, group discussions and asking questions that require students to solve problems rather than theoretical inquires. This acknowledges the collaboration principles in learning environments proposed by Clark (2001). Although the students showed their privacy concern using Facebook for their study duties, it seemed that their concern went away after experiencing the intervention and the benefits of the Facebook page. This process is a known concept and has been discussed [35]. The instructors are recommended to use some non-pedagogical interactions and activities with students over the Facebook page. This empowers the social context that improves the students' engagement. This is in agreement with the findings of Abedin, Daneshgar, & D'Ambra (2011).

In terms of teaching presence, it is recommended that the instructors pay adequate attention to contents that they choose for the Facebook page. Acknowledging the findings of Talaei Khoei and Talaei-Khoei [23], the student engagement occurs along the right amount of learning materials. Instructors should realize that the long-term engagement can only happen where there are many members of the group interacting. If the Facebook group is continuously populated with learning activities, the students find it difficult to find an opportunity to learn from their peers. As a result, the students would only respond to the posts and not discuss the questions with their peers. It is strongly recommended that the learning materials on Facebook should be designed to facilitate the students' engagement with their peers. They should not be overwhelming. It is also recommended that the questions posted on the Facebook page refer to the real scenarios. This would not only increase the interest of the students, but also avoid the risk of abstract discussions. The instructors are also recommended to clearly communicate their expectations from the Facebook page and how it can help students in their understanding of the flipped materials. One of the issues that came up in the experiment was related to the frequent feedbacks. The instructor was waiting a week for the students to put their inputs. However, the students believed that this made an uncertain learning environment and they needed the instructors' feedbacks more frequently and in a timely fashion.

## 5.2. Limitations and Future Work

The major limitation of this study is related to COI as the lens of analysis. Shea & Bidjerano (2010) critiques that COI does not include learners' presence and amend this framework to Revised Community of Inquiry (RCOI) [37], [38]. In RCOI, learner's presence is defined as the learning elements that engage students in the environment. Talaei-Khoei et al. [33] looks at the students' learning experience when using Facebook in Flipped classes. This opens avenues of research to include such perspectives into the current work. Another limitation is the social complexity involved in the experiments. This makes it almost impossible to conduct complete cross analysis. A further limitation related to this study is that the experiments did not allow finely tuned analysis of individual differences in the outcomes of the study. Nakayama et al. (2015) believe that one consideration in the use of social media for flipped learning is that the personality differences of students impact their frequency of use of Social Network Sites. Thus, a new variable that affects the flipped learning strategy is introduced which has not been taken into the scope of the current work. Given the importance of individual differences on outcomes, further research should examine the relationship between antecedents such as gender, parental education level, etc. on student engagement with the flipped learning materials. This can serve as a future study.

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